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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/064,529	07/24/2002	Peter Speier	20.2817	8343

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SCHLUMBERGER OILFIELD SERVICES
200 GILLINGHAM LANE
MD 200-9
SUGAR LAND, TX 77478

EXAMINER	
SHRIVASTAV, BRIJ B	
ART UNIT	PAPER NUMBER
2859	

DATE MAILED: 08/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

AA

Office Action Summary	Application No.	Applicant(s)	
	10/064,529	SPEIER, PETER	
	Examiner	Art Unit	
	Brij B Shrivastav	2859	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 July 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *42* is/are allowed.

6)☒ Claim(s) *1-28 and 30-39* is/are rejected.

7)☒ Claim(s) *29,40 and 41* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanawe et al (US 5,677,624), in view of Taicher et al (US 5,757,186).

As regards to claim 1 and 16, Watanabe et al teach magnetic resonance imaging instrument having a magnet to create a static magnetic field with selected magnetic field strength in a zone of interest (figure 83). The instrument has an antenna assembly adapted to resonate at a first resonance frequency corresponding to the first frequency of a first nucleus at a selected magnetic field strength (figure 83, numeral 7), and a second frequency corresponding to a resonance frequency of a second nucleus, a different nucleus than the first one, at a selected magnetic field strength (figure 83, numeral 8). Further, the instrument has means to produce a radio frequency magnetic field according to a selected pulse sequence in the zone of interest, and to operatively couple it with the antenna assembly (figure 83, numerals 7, 8, 12, 13, and 19), and has means coupled to the antenna assembly to detect nuclear magnetic resonance signals at the first resonance frequency (figure 83, numerals 11, 12, 14 and 16). Watanabe et al do not teach a housing, having a magnet and an antenna assembly, adapted to move in

a well-bore in earth formation. Taicher et al teach a housing, with a magnet and antenna assembly, adapted to move in a well-bore in earth formation (figures 1, 5).

It would have been obvious to one of ordinary skill in the art to adapt Taicher et al's housing to be placed in a well-bore in earth formation to identify economically and commercially useful minerals in the earth formation.

As regards to claims 2-5, Watanabe et al teach a proton and a carbon-13 as the first and the second nucleus (see abstract). However, Watanabe does not teach oxygen-17 and phosphorous-31, which are commonly used in the art. Therefore, it would have been obvious to one of ordinary skill in the art to use these two nuclei to further improve and increase capabilities of the instrument to analyze these two nuclei

As regards to claims 6-8 and 17, Watanabe et al do not further teach: the zone of interest is the earth formation surrounding the well-bore; the housing is adapted to be lowered into the borehole on an electric cable; the housing forms a part of the drilling tool assembly. Taicher et al teach: the zone of interest is the earth formation surrounding the well-bore (figure2, numeral 28); the housing is adapted to be lowered into the borehole on an electric cable (figure 1); the housing forms part of a drilling tool assembly (figure 1, numeral 10). It would have been obvious to one of ordinary skill in the art to adapt Taicher et al's drilling tool with the housing to be lowered in the zone of interest of a borehole in the earth formation to identify commercially useful minerals in the earth formation.

Claims 9 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanawe et al (US 5,677,624), in view of Taicher et al (US 5,757,186), and further in view of Kleinberg (US 6,346,813).

As regards to claims 9 and 18, neither Watanabe et al nor Taicher et al further teach housing as a part of the formation fluid sampling tool. Kleingerg teaches housing as a part of formation fluid sampling tool (see abstract, figure 2). It would have been obvious to one of ordinary skill in the art to adapt Kleinberg's housing, which forms a part of the formation fluid sampling tool, with the NMR instrument of Watanabe et al and Taicher et al to make it more versatile to obtain and analyze the formation fluid samples.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Watanawe et al (US 5,677,624), in view of Taicher et al (US 5,757,186), and further in view of Doty (US 5,162,739).

As regards to claim 10, neither Watanabe et al nor Taicher et al teach antenna assembly coupled to a double resonance circuit. Doty teaches a multi-tuned coil for NMR. It would have been obvious to one of ordinary skill in the art to adapt Doty's coil to be coupled with the antenna of the NMR instrument of Watanabe et al and Taicher et al to make the instrument more versatile to operate.

Claims 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanawe et al (US 5,677,624), in view of Taicher et al (US 5,757,186), and further in view of Kunz (US 5,043,664).

As regards to claims 11-14, neither Watanabe et al nor Taicher et al teach: the antenna assembly has the first and the second loop/saddle antenna disposed

orthogonal to each other, and connected to a circuit to transmit first and second frequency. Kunz teaches the antenna assembly has the first and the second loop/saddle antenna disposed orthogonal to each other, and connected to a circuit to transmit first and second frequency (figure 1). It would have been obvious to one of ordinary skill in the art to adapt Kuntz's antenna assembly with the combined resonance instrument of Watanabe et al and Taicher et al to record NMR signals with increased signal to noise ratio to improve chemical analysis of the fluid samples.

Claims 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Watanawe et al (US 5,677,624), in view of Taicher et al (US 5,757,186), and further in view of Edwards et al (US 6,111,409).

As regards to claim 15, neither Watanabe et al nor Taicher et al further teach CPMG pulse sequence. Edwards et al teach CPMG pulse sequence to be used in earth formation exploration (figure 6, column 10, lines 18-26). It would have been obvious to one of ordinary skill in the art to use CPMG pulse sequence of Edwards et al with the combined resonance instrument of Watanabe et al and Taicher et al to improve signal to noise ratio by avoiding problems due do in-homogeneity of the static magnetic field and its effects on diffusion.

2. Claims 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanawe et al (US 5,677,624), in view of Taicher et al (US 5,757,186), and further in view of Kleinberg (US 6,346,813).

As regards to claims 19 and 20 Watanabe et al teach magnetic resonance imaging instrument producing a static magnetic field of a selected magnetic field

strength in a zone of interest (figure 83). The instrument has an antenna, which is adapted to resonate at a frequency corresponding to the frequency of a non-proton nucleus (figure 83, numeral 8; a carbon-13 nucleus). Further, the instrument has means to produce a radio frequency magnetic field according to a selected pulse sequence in the zone of interest, and to operatively couple it with the antenna (figure 83, numerals 8, 12, 13, and 19), and means to detect nuclear magnetic resonance signals (figure 83, numerals 8, 9, 11, 12, 14). Watanabe et al do not teach a housing, with the magnet and antenna assembly, adapted to move in a well-bore in earth formation. Taicher et al teach a housing adapted to move in a well-bore in the zone of interest in earth formation (figures 1, 5, numeral 28). Further, neither Watanabe et al nor Taicher et al teach a CPMG pulse sequence. Kleinberg teaches means for CPMG pulse sequence (column 6, lines 15-21).

It would have been obvious to one of ordinary skill in the art to combine Taicher et al's magnet and antenna housing with the NMR instrument of Watanabe, and further adapt Kleinberg's means for CPMG pulse sequence with the combined NMR imaging instrument of Watanabe et al and Taicher et al to improve artifacts caused by in-homogeneities in the static magnetic field improving image quality.

As regards to claim 21, neither Watanawe et al nor Taicher further teach housing as a part of the formation fluid sampling tool. Kleinberg teaches housing as a part of the formation fluid sampling tool (figures 1 numeral 15, figures 2, 3). It would have been obvious to one of ordinary skill in the art to adapt Kleinberg's housing as a part of a formation fluid sampling tool with the of Watanabe et al and Taicher et al's combined

NMR instrument to avoid sample contamination by mud filtrate, avoiding mud filtrate being mixed with the formation fluids collected for analysis, and improving fluid analysis.

3. Claims 22-28, and 30-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kleinberg et al (US 6,346,813), and further in view of Watanabe et al (5,677,628).

As regards to claim 22 and 24, Kleinberg teach a method for determining a connate formation fluid property using a nuclear magnetic resonance instrument in a well-bore using a static magnetic field having a selected magnetic field strength in a formation fluid (figure 1, see abstract). Kleinberg, using nuclear magnetic resonance instrument, do not teach to acquire nuclear magnetic resonance measurements having J coupling information, and to derive J coupling information from these measurements. Watanabe et al, using nuclear magnetic resonance instrument, teach to acquire nuclear magnetic resonance measurements having J coupling information, and to derive J coupling information from these measurements (figure 83, columns 1 and 2; lines 5-67, 1-11).

It would have been obvious to one of ordinary skill in the art to adapt method of Watanabe et al to the measurement information of Kleinberg to derive J coupling information on nuclear species present in the formation fluid samples to improve exploration techniques for commercially useful hydrocarbons in the earth formation.

As regards to claims 23 and 24, Kleinberg teaches withdrawal of connate fluids in the samples from earth formation surrounding the well-bore (figure 1).

As regard to claims 25 and 26, Kleinberg teaches use of CPMG in various forms to acquire fluid analysis (column 1, lines 15-21).

As regards to claims 27, 28, 30-39, Kleinberg further does not teach homonuclear and heteronuclear J couplings, and various combinations of pulse sequences, and Fourier analysis . Watanabe et al teach homonuclear and heteronuclear J couplings, and various combinations of pulse sequences and Fourier analysis to achieve data on J couplings, thereby obtaining much needed information to improve signal to noise ratio for the data obtained using collected samples (column 1, lines 5-65, column 2, lines 1-48).

Allowable Claims

4. Claims 16, 40, and 41 objected, and will be allowable, if presented in independent form including limitations of the claim(s) they are dependent on.

5. Claim 42 is allowable, because the prior art of record does nor teach a method for estimating a volume fraction of oils in earth formation fluids, using nuclear magnetic resonance to acquire J coupling information of carbon-hydrogen nuclei in samples of earth formation fluids by comparing a total magnitude of the J coupling modulated part to a total magnitude of the NMR measurements.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brij B Shrivastav whose telephone number is 703-305-0649. The examiner can normally be reached on 7 AM to 4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego F. F. Gutierrez can be reached on 703-308-3875. The fax phone

numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-304-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-0956.

Bbs

July 18, 2003

Brij B. Shrivastav

Patent Examiner